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Three new species of genus *Anomala* Samouelle from Yunnan, China (Coleoptera: Scarabaeidae, Rutelinae)

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Abstract. – Three new species of genus *Anomala* Samouelle, 1819 from Yunnan Province of China are described: *A. semiserrata* **sp. nov.** from Baoshan city, Fugong county, Lancang county, and Puer city; *A. yanxui* **sp. nov.** from Maguan county; *A. yemaoi* **sp. nov.** from Mengzi city, Xinping county, Yuanmou county, and Yun county.

Wang F.-L., 2022. – Three new species of genus *Anomala* Samouelle from Yunnan, China (Coleoptera: Scarabaeidae, Rutelinae). *Faunitaxys*, 10(56): 1 – 9.

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Introduction

Over the past three year, thirty-two species of genus *Anomala* were described from China and adjacent regions (Huang & Wang 2019; Prokofiev 2021a, b; Wang 2020, 2021a, b, c, Wang & Zorn 2021; Zhao 2019, 2021; Zhao & Zorn 2022). In the present study, three new *Anomala* species are described from Yunnan, China. In order to distinguish the new species from the allied species, the illustrations of male genitalia for 8 known species are provided:

- *A. spilopteroides* Ohaus, 1914;
- *A. iwasei* Miyake, 1994;
- *A. sapa* Miyake, 1994;
- *A. subpilosa* Lin, 1996;
- *A. vietnamica* Miyake, 1996;
- *A. transversa* Lin, 1999;
- *A. projecta* Lin, 2002;
- *A. dongi* Wang, 2020.

Material and methods

Morphological terminology used in the present study was introduced by Ahrens *et al.* (2007). Type specimens of the new species herein described bear the following two labels: 1 (red print label): “HOLOTYPE or PARATYPE / *Anomala* [species name], Fa-Lei Wang det. 2022”; 2 (white print label): collecting data. Separate label lines are indicated by a slash (/), and separate labels by a double slash (//).
The materials examined are housed in the following collections:

CFLW: Fa-Lei Wang Personal Collection, Chongqing, China.
CZGG: Collection Carsten Zorn, Gnoien, Germany.
CZMZ: Collection Ming-Zhi Zhao, Guangzhou, China.
MYNU: Mianyang Normal University, Mianyang, China.
MFNB: Museum für Naturkunde, Leibniz-Institut für Evolutions- und Biodiversitätsforschung, Berlin.

Description of new species

Anomala yanxui sp. nov. (颜旭异丽金龟)

(Fig. 1-10, 56 & 61)

ZooBank: http://zoobank.org/9FFA0D34-C37E-42FB-9E14-CE4FFD2EA596

Holotype, ♂ (MYNU): CHINA, Yunnan / Wenshan, Maguan County / Gulinjing, 24.VII.2021 / Xu Yan leg. // HOLOTYPE / *Anomala yanxui* / Fa-Lei Wang det. 2022.

Paratypes, 7 ♀♀ (MYNU): CHINA, Yunnan / Wenshan, Maguan County / Gulinjing, 24.VII.2021 / Xu Yan leg. // PARATYPE / *Anomala yanxui* / Fa-Lei Wang det. 2022.

Description of holotype (Fig. 1, 2, 5-9)

General appearance. – Body length: 15.4 mm, width: 7.9 mm. Body elongate ovoid, convex in profile.

Color. – Whole body dark brown with dark green metallic luster, weaker on elytra and pygidium (Fig. 1 & 9).

Head. – Clypeus subtrapezoidal, anterior margin well crooked, moderately reflexed, surface with dense transverse coalescent punctures, each puncture bearing one short yellow setae. Fronto-clypeal suture slightly arcuate forward. Frons with dense punctures which bearing short setae, punctures coalescent anteriorly, interocular distance equals 0.62 times the maximum transverse head width, with several long yellow setae along eyes. Vertex with sparer punctures. Antennal club shorter than footstalks.

Pronotum. – Wide trapezoid, sides well crooked. Anterior marginal line weak, without posterior marginal, posterior narrow margin smooth. Anterior angles sub-right-angle, posterior angles obtuse, broadly rounded. Surface

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densely punctate, gradually becoming denser transverse punctures to the side, each puncture bearing one short yellow setae; with a weak longitudinal medial line ridged in the posterior half.

Scutellum. – 0.75 times as long as wide, surface with larger punctures than on pronotum, partly transversely confluent.

Elytra. – Surface with regular striae, intervals raised distinctly. Surface densely with transverse punctures, each puncture bearing one short yellow setae. Humeral umbone moderately strong. Lateral margin becoming wider after umbone, epipleuron disappear in posterior 1/3.

Pygidium. – Weakly convex in profile, area slightly protrude before apex. Surface with reticulate vein, densely covered with yellow setae, longer on apex.

Abdominal ventrites. – Surface with dense transverse punctures in the middle, gradually forming smaller transverse striae to the sides, with several short yellow setae medially, denser and shorter on the sides.

Legs. – Protibia bidentate, apex of terminal tooth rounded, basal tooth sub-right-angle. Mesotibia and metatibia fusiform, surface with dense and coarse longitudinal gullies, inner surface with a row of long setae neatly. Protarsal and mesotarsal outer claw deeply clefted.

Genitalia. – As in Fig. 5-8.

Female (Fig. 3, 4 & 10). – Body length 15.6 mm, width 8.2 mm. Pronotum more convex in profile. Terminal tooth of protibia longer. Outer margin of vaginal palps rounded, inner margin incurve, surface coarse, densely with long yellow hair.

Measurement. – Male: body length 15.4 mm, width 7.9 mm. Female: body length 14.1-15.3 mm, width 7.5-8.0 mm.

Diagnosis. – So far, twenty one available *Anomala* species were mentioned in *Anomala hirsutula* species-group depending on body dorsal surface with dense, fine, short setae (Keith 2008; Lin 1996; Machatschke 1957; Miyake 1994, 1996; Prokofiev 2021b; Wang 2021c; Wang & Zorn 2021):

- *A. yunnana* Fairmaire, 1886
- *A. hirsutula* Nonfried, 1892
- *A. pilosella* Fairmaire, 1898
- *A. lignea* Arrow, 1917
- *A. itoi* Miyake, 1994
- *A. iwasei* Miyake, 1994
- *A. sapa* Miyake, 1994
- *A. barbellata* Lin, 1996
- *A. brevihirta* Lin, 1996
- *A. capillula* Lin, 1996
- *A. hirsutoides* Lin, 1996
- *A. montana* Lin, 1996
- *A. planicauda* Lin, 1996 (female holotype)
- *A. subpilosa* Lin, 1996
- *A. subtomentella* Lin, 1996
- *A. subtrinata* Lin, 1996
- *A. trichophora* Lin, 1996
- *A. katsurai* Miyake, 1996
- *A. vietnamica* Miyake, 1996
- *A. myanmarensis* Keith, 2008
- *A. dongi* Wang, 2021

Most of species in this group show rather similar appearance (except *A. yunnana*), but we can distinguish them by the shape of male genitalia and female vaginal palps (Lin 1996).

This new species is related to *A. subpilosa* (China: Guizhou, Hubei) and *A. vietnamica* (Vietnam) depending on the characteristic of male genitalia by (Lin 1996; Miyake 1996; Zorn *et al.*, 2017):

- Ventral plate rather short (Fig. 6 & 40);
- Basal half of parameres broad, anterior half of parameres are slender branch (Fig. 8, 41 & 43);
- Inner margin of the anterior branches wear short and dense yellow setae (Fig. 5-8, 39-43).

Anomala yanxui **sp. nov**. can be distinguished from *A. subpilosa* and *A. vietnamica* by the extended branches of two parameres upswept in lateral view and inner margin of two parameres without serration (Fig. 7, 8, 41 & 43).

Anomala yanxui is different from *A. planicauda* by the female vaginal palps (Lin 1996) shorter and surface with denser long yellow hair (Fig. 10).

Etymology. – The species is named after Mr. Xu Yan, who collected all type specimens.

Distribution (Fig. 61). – China: Yunnan (Maguan).

***Anomala semiserratus* sp. nov. (半齿异丽金龟)**

(Fig. 11-20, 57 & 61)

ZooBank: http://zoobank.org/1013E460-9494-4BD0-800F-72E60BFDFE66

Holotype, ♂ (MYNU), CHINA, Yunnan / Puer City, Simao / Caiyanghe, III.2018 / Jian-Yue Qiu, Chen-Li Peng & Hao Xu leg. // HOLOTYPE / *Anomala semiserrata* / Fa-Lei Wang det. 2022;

Paratypes:

- **1** ♂ & **2** ♀ (CZGG), CHINA, W of Yunnan, Nujiang / valley, Fugong county. 2000m. / 2020.6–7. // PARATYPE / *Anomala semiserrata* / Fa-Lei Wang det. 2022;
- **1** ♂ & **1** ♀ (CZMZ), Yunnan, Pianma / Fugong, Maji Township / Peng Pan leg. / 2014 late VI – early VII, at light. // PARATYPE / *Anomala semiserrata* / Fa-Lei Wang det. 2022;
- **1** ♂ (CZMZ), CHINA, Yunnan, Lancang County / 2015.VI.15, Chao Li leg. // PARATYPE / *Anomala semiserrata* / Fa-Lei Wang det. 2022;
- **1** ♂ (CZMZ), CHINA, Yunnan, Baoshan, Tengchong / Gaoligongshan, Baihualing / 2016.V.17–19, Zhi-Wei Dong leg. // PARATYPE / *Anomala semiserrata* / Fa-Lei Wang det. 2022.

Description of holotype (Fig. 11, 12, 15-20)

General appearance. – Body length: 15.5 mm, width: 8.0mm. Body elongate ovoid, convex in profile.

Color. – Head metallic green and coppery, antennal club brown, footstalks yellow. Pronotum mostly yellow, with two disjoint, broad metallic green longitudinal bands. Scutellum brown, sides darker. Anterior 1/3 of elytra yellow, a broad, zigzag black band from median sides to suture, behind black band with a wiggly transverse yellow band from sides to sutural, posterior 1/3 of elytra dark brown. Pygidium yellow with weak metallic green luster, each side with metallic green broad patch, anterior corners yellow. Ventral surface dark mostly metallic green and coppery, anterior 1/2 of abdominal ventrite 1 yellow, each side of abdominal ventrites 2-4 and propygidium with yellow spots, posterior margin of propygidium yellow. Metasternum blackish-green, with a large yellow spot laterally, metacoxa yellow. Tarsus, protibia, mesotibia (partly), metatibia, and all the joints of legs dark green, all femurs yellow.

Head. – Clypeus approximatively semicircular, width more than twice as length, anterior corners broad rounded, anterior margin slightly reflexed, surface densely rugo-punctate. Fronto-clypeal suture slightly arcuate backward. Frons densely punctate, punctures coalescent posterior of fronto-clypeal suture, interocular distance equals 0.63 times the maximum transverse head width. Vertex with dense, weak punctures. Antennal club shorter than footstalks.

Pronotum. – Wide trapezoid, sides convergent before middle. Anterior marginal line complete, posterior marginal line weak. Anterior angles acute, posterior angles obtuse, rounded. Surface densely and finely punctate, sparer on the side.

Scutellum. – 0.70 times as long as wide, surface densely punctate.

Elytra. – Surface with regular striae, intervals raised distinctly, rather weak anteriorly, interval beside sutural interval board. Surface with dense punctures, epipleuron narrow, disappear on posterior 1/3 of lateral margin.

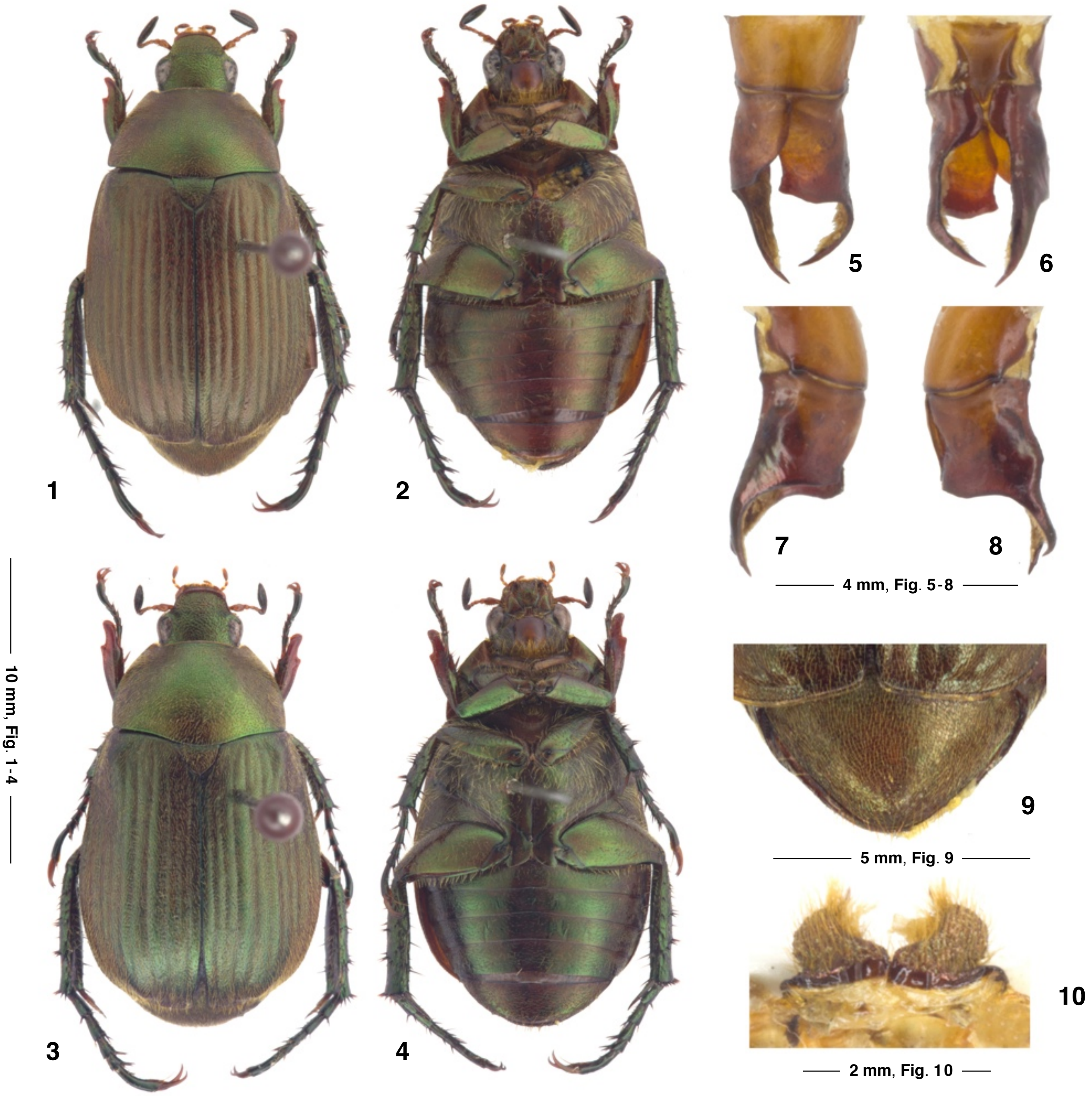

Fig. 1-10. *Anomala yanxui* **sp. nov.**

1, **2** & **5-9**. Holotype, ♂. **3**, **4** & **10**. Paratype, ♀. **1-4**. Habitus. **5-8**. ♂ genitalia. **9**. Pygidium. **10**. Vaginal palps. **1**, **3** & **5**. Dorsal view. **2**, **4** & **6**. Ventral view. **7**. Lateral view from left. **8**. Lateral view from right.

Pygidium. – Weakly convex in profile, area before apex angle raised. Surface densely transverse striae, forming a striolation which is arranged concentrically around the bulge, apex with yellow setae.

Abdominal ventrites. – Surface with dense, shallow transverse punctures, posterior margin smooth, each ventrite with a transverse row of long yellow setae, setae on ventrites 2-3 rather spare.

Protibia bidentate, terminal tooth prolonged, basal tooth acute. Mesotibia and metatibia fusiform, inner surface with a row of long setae. Protarsal and mesotarsal outer claw clefted.

Genitalia. – As in Fig. 16-19.

Female (Fig. 13 & 14). – Pronotum more convex in profile, the lateral margins of pronotum more rounded. Terminal tooth of protibia wider, last joint of protarsal slenderer.

Measurement. – Male: body length 15.5 mm, width 8.0 mm. Female: body length 15.5-16.6 mm, width 7.8-8.5 mm.

Diagnosis. – Depending on male genitalia, *Anomala semiserrata* **sp. nov.** is similar to six species (Lin 1999, 2002; Ohaus 1914; Prokofiev 2013; Zorn 2005):

- *A. flavofasciata* Arrow, 1912 (Bhutan, India, Nepal)
- *A. spilopteroides* Ohaus, 1914 (China: Guangxi, Vietnam)
- *A. transversa* Lin, 1999 (China: Yunnan)
- *A. projecta* Lin, 2002 (China: Hainan)
- *A. accincta* Prokofiev, 2013 (Vietnam)
- *A. bulbicaula* Prokofiev, 2013 (Vietnam)

Species above show common characteristics as:

- Body color brown or dark brown;
- Elytra always with wiggly transverse band, sometimes discrete; several parts of parameres have wrinkled membranes (surface only wrinkled in *A. spilopteroides*) (Fig. 16-19, 44-55);
- Left paramere has an elongated ossific branch, and sometimes the branch is encysted in the wrinkled membrane (*A. flavofasciata*).

The new species can be distinguished from all the species above by head with stronger metallic green luster, pronotum with two disjoint, broad metallic green longitudinal bands (Fig. 11, 13 & 14), pygidium predominantly yellow, and apex of the branch of left paramere rather broad, only left margin with successive saw-teeth (Fig. 16).

Etymology. – The specific epithet refers to the right margin of the left paramere (in dorsal view) bearing successive saw-teeth.

Distribution (Fig. 61). – China: Yunnan (Fugong, Lancang, Puer, and Baoshan).

Anomala yemaoi sp. nov. (叶茂异丽金龟)

(Fig. 21-29, 58-61)

ZooBank: http://zoobank.org/9DD54205-DD2E-4485-9A8D-EB8ADF4485F8

Holotype, ♂ (MYNU), CHINA, Yunnan / Lincang City, Yunxian County / Manwan, Manjiu, VII.2014 / 100°36'15.24" E, 24°72'11.84" N / alt. 2,000 m, Mao Ye leg. // HOLOTYPE / *Anomala yemaoi* / Fa-Lei Wang det. 2022.

Paratypes:

- **1** ♀ (MYNU), CHINA, Yunnan / Lincang City, Yunxian County / Manwan, Manjiu, VII.2014 / 100°36'15.24" E, 24°72'11.84" N / alt. 2,000 m, Mao Ye leg. // PARATYPE / *Anomala yemaoi* / Fa-Lei Wang det. 2022;
- **1** ♂ (CFLW), CHINA, Yunnan / Lincang City, Yunxian County / Manwan, Manjiu, 8–12.V.2015 / 100°36'15.24" E, 24°72'11.84" N / alt. 2,000 m, Fa-Lei Wang leg. // PARATYPE / *Anomala yemaoi* / Fa-Lei Wang det. 2022;
- **1** ♂ & **1** ♀ (CFLW), CHINA, Yunnan / Lincang City, Yunxian County / Manwan, Manjiu, 19.VI.2016 / 100°36'15.24" E, 24°72'11.84" N / alt. 2,000 m, Mao Ye leg. // PARATYPE / *Anomala yemaoi* / Fa-Lei Wang det. 2022;
- **2** ♂ & **1** ♀ (CFLW), CHINA, Yunnan / Lincang City, Yunxian County / Manwan, Manjiu, VII.2014 / 100°36'15.24" E, 24°72'11.84" N / alt. 2,000 m, Zi-Chun Xiong leg. // PARATYPE / *Anomala yemaoi* / Fa-Lei Wang det. 2022;
- **1** ♂ & **1** ♀ (CZGG), China, C. Yunnan, Yuxi, Xinping, 2000m, v-viii. 2019, local collector leg.;
- **1** ♂ (MFNB): China. Prov. Yunnan. Vallis flumin. Soling-ho.;
- **1** ♂ (MFNB), Yunnan Mouy-Tse.

Description of holotype (Fig. 21, 22 & 25-28)

General appearance. – Length: 13.6 mm, greatest width: 7.1 mm. Elongate ovoid, moderately convex.

Color. – Dorsally dark reddish brown with weak metallic green luster, which is moderately strong on the head and pronotum. Anterior margin of clypeus dark reddish-brown, antenna dark brown, antennal club yellowish brown. Ventral coloration dark reddish brown with dark green metallic luster except the middle of the last abdominal ventrite. Legs dark brown with noticeable metallic green luster, all the claws and apex of protibia reddish-brown.

Head. – Clypeus subtrapezoidal, anterior angles broadly rounded, with dense transverse punctures, anterior margin strongly reflexed. Frons very densely punctate, sparser at base, interocular distance 0.65 times as wide as the maximum transverse width of head. Antenna covered with pale hairs, antennal club shorter than preceding 6 antennomeres.

Pronotum. – Disc densely, uniformly punctate, circular punctures anteriorly, transverse punctures posteriorly, denser at sides, each puncture bearing one yellow short seta. Anterior angles sub-rightangle, posterior angles slightly acute, rounded. Sides convex at middle, without lateral and basal marginal line, with smooth area along posterior margin.

Scutellum. – Triangular, wider than long, apex rounded. Surface variably punctate, sparsely at apex, with one short seta in most of punctures.

Elytra. – Approximately 1.25 times as long as wide, with dense, irregular punctures, denser around scutellum and on sides, punctures forming several striae, intervals raised distinctly, the second stria faint, all striae weak at base. Humeral umbone processed, epipleuron narrow, disappearing at posterior 1/3.

Pygidium. – Moderately convex in profile, with transverse punctures, dense at disc, covered with short, brown setae, long and sparse at apex. All margins rounded, posterior margin flat.

Abdominal ventrites. – With dense, large, transverse punctures, punctures gradually becoming denser and smaller to the sides, each puncture with one short, brown seta. Hind margin of abdominal ventrites 1–4 smooth, abdominal ventrites 1–4 with a row of long, sparse, brown setae near middle.

Legs. – Protibia bidentate, apical tooth rather long, basal tooth short, acute, inner spur long. Mesotibia and metatibia slightly fusiform, with several scattered depressions and brown setae (scattered or aligned). Protarsal and mesotarsal outer claws clefted, metatarsal inner claws long, simple.

Genitalia. – As in Fig. 25-27.

Female (Figs. 23, 24 & 29). – Body shape moderately thinner; pronotum more convex, with a distinct longitudinal medial furrow. Terminal tooth of protibia longer, obtuse. With two arcuate vaginal palps, with dense yellow hair at apex, membrane between two vaginal palps osseous, broad and smooth.

Measurement. – Male: body length 13.4-13.9 mm, width 6.6-7.1 mm. Female: body length 13.5-14.2 mm, width 6.7-6.8 mm.

Diagnosis. – In the *Anomala hirsutula* species-group (see diagnosis of A. yanxui), this new species is related to *A. iwasei* Miyake, 1994 (China: Yunnan; Laos; Vietnam), *A. sapa* Miyake, 1994 (China: Guangxi; Vietnam) and *A. dongi* Wang, 2021 (Laos) depending on the characteristic of male genitalia (Lin 1996; Miyake 1994; Wang 2021c; Zorn *et al.*, 2017):

- Ventral plate of male genitalia almost the same length as the parameres (Fig. 27, 32, 35 & 38);
- Parameres almost symmetric (Figs. 25, 30, 33 & 36);
- Outer margin and the dorsal surface (anterior half) of parameres wear long setae (Fig. 25, 30, 33 & 36).

The new species can be distinguished from *A. iwasei* in male genitalia by:

- Size distinctly smaller;
- Ventral plate shorter than the parameres (Figs. 27 & 32), weakly widened at apex (Fig. 26 & 31);
- Middle of inner margin of the parameres reflexed (Figs. 25 & 30), and not extended (Fig. 27 & 32).

Anomala yemaoi **sp**. **nov**. is different from *A. dongi* and *A. sapa* in male genitalia by size smaller, the ventral plate slenderer in anterior half (Fig. 26, 34 & 37).

Anomala yemaoi **sp**. **nov**. is different from *A. planicauda* by female vaginal (Lin 1996) palps longer and slenderer (Fig. 29).

Etymology. – The species is named after Mr. Mao Ye, who collected most type specimens.

Distribution (Fig. 61). – China: Yunnan (Mengzi, Xinping, Yuanmou, and Yunxian).

Remarks. – The locations of two old place names on the labels of two paratypes were consulted Dr. Hao Xu (MYNU): “China. Prov. Yunnan. Vallis flumin. Soling-ho” and “Yunnan Mouy-Tse”. He has much experience in identifying old names of the places in China wrote by westerners in taxonomic works and specimen labels of *Cetoniinae*. “Soling-ho” is Longchuan Jiang at Yuanmou county, Yunnan province. “Mouy-Tse” is Mengzi city of Honghe, southeastern Yunnan province (Fig. 61).

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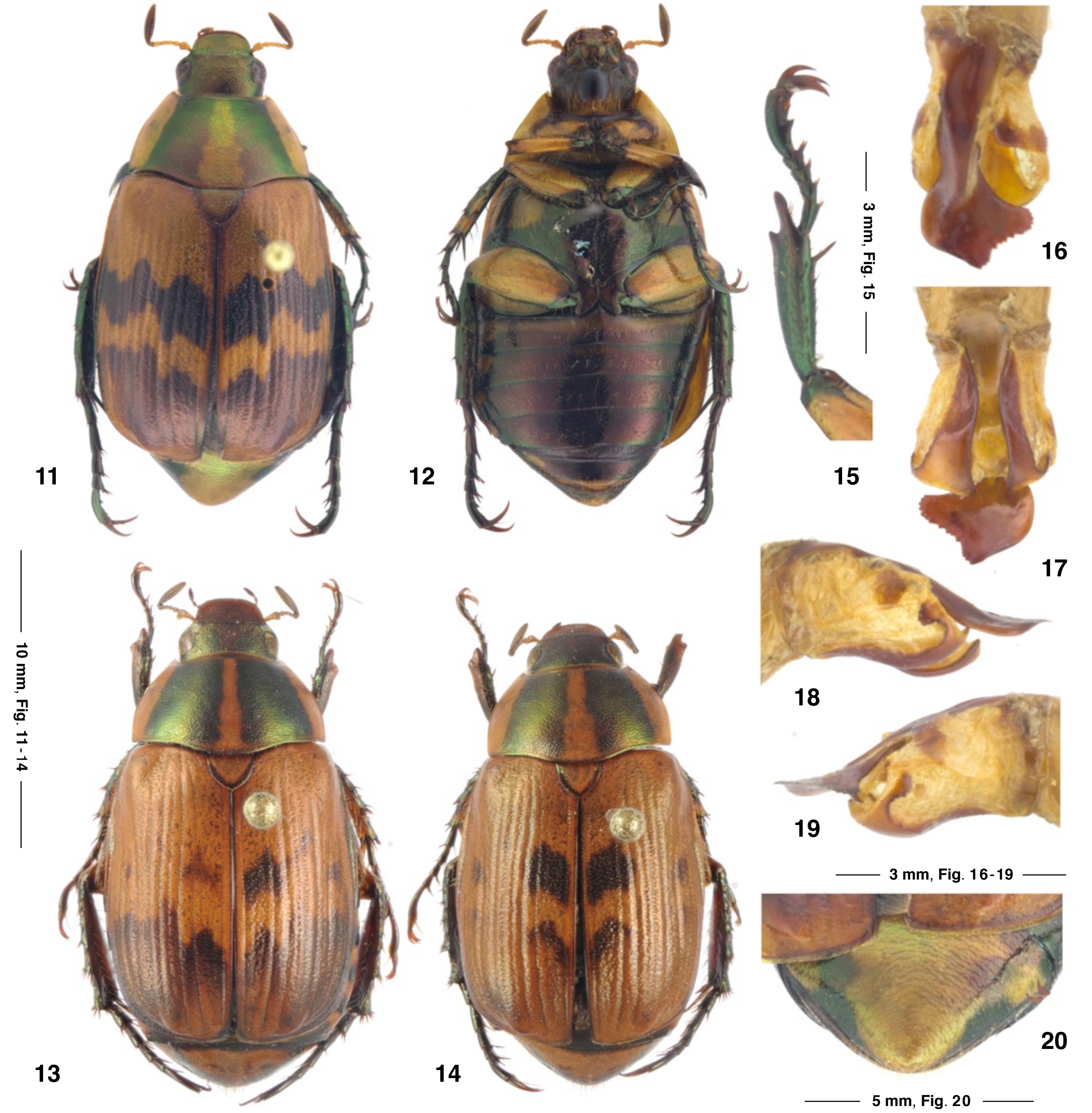

Fig. 11-20. *Anomala semiserrata* **sp. nov**.

11, **12** & **15-19**. Holotype, ♂. **13** & **14**. Paratype, ♀. **11-14**. Habitus. **15**. Protibia and protarsal. **16-19**. ♂ genitalia. **20**. Pygidium. **11**, **13**, **14** & **16**. Dorsal view. **12** & **17**. Ventral view. **18**. Lateral view from left. **19**. Lateral view from right

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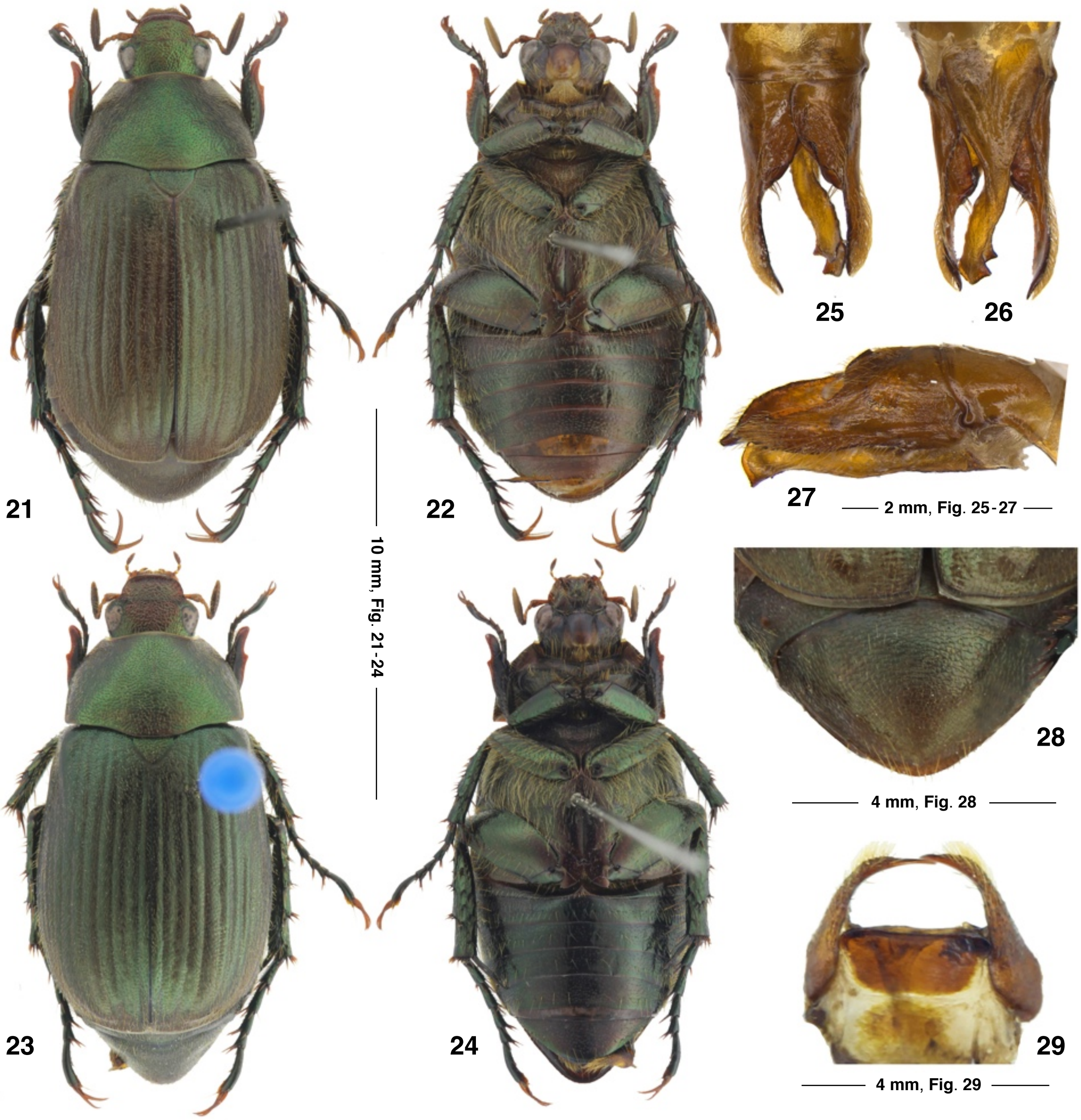

Fig. 21-29. *Anomala yemaoi* **sp. nov**.

21, **22** & **25-28**. Holotype, ♂. **23**, **24** & **29**. Paratype, ♀. **21-24**. Habitus. **25-27**. ♂ genitalia. **28**. Pygidium. **29**. Vaginal palps. **21**. **23** & **25**. Dorsal view. **22**, **24** & **26**. Ventral view. **27**. Lateral view from right.

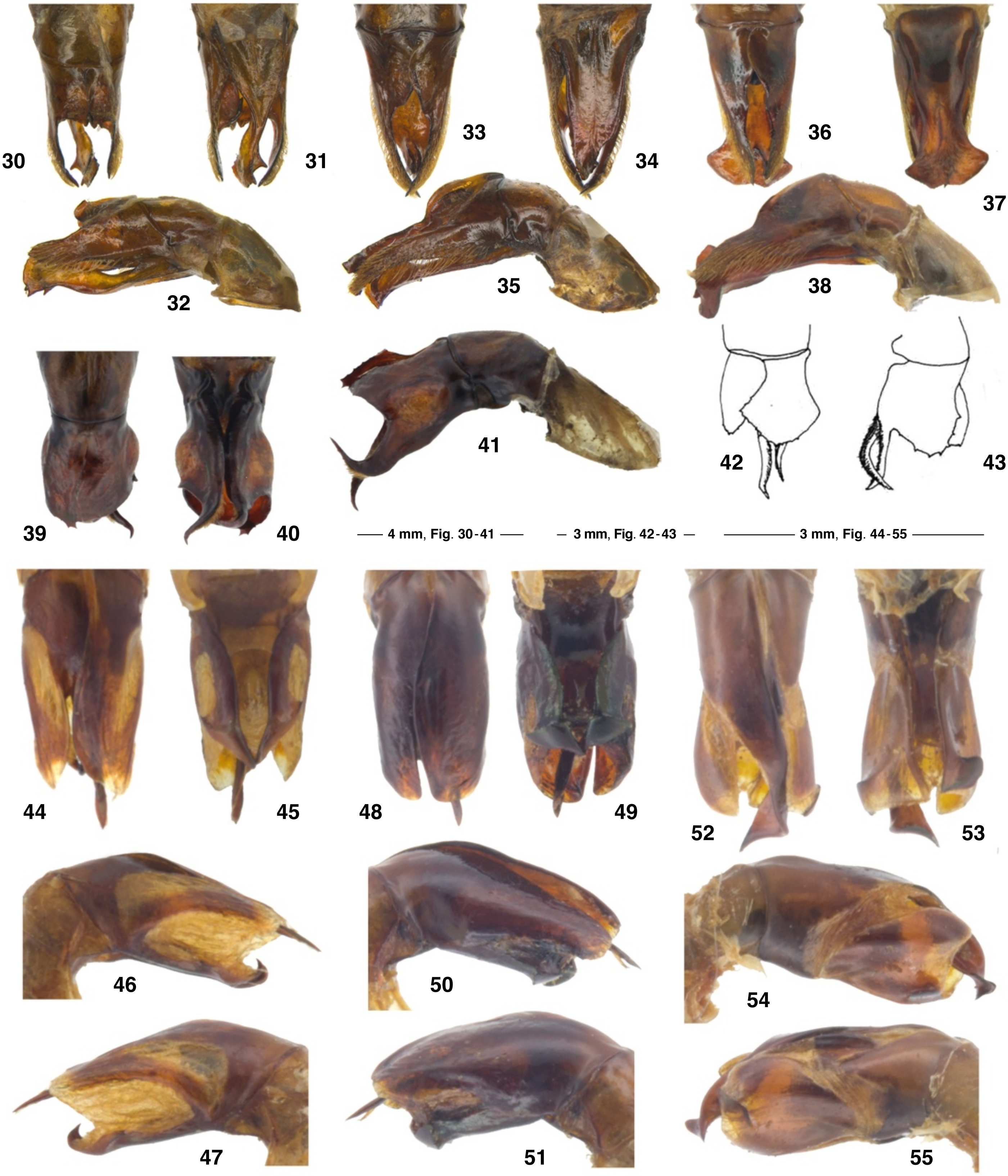

Fig. 30-55. ♂ genitalia of *Anomala* spp.

30-32. *A. iwasei* Miyake, 1994 (from Yunnan, China). **33-35**. *A. sapa* Miyake, 1994 (from Guangxi, China). **36-38**. *A. dongi* Wang, 2021 (from Laos). **39-41**. *A. subtrinata* Lin, 1996 (from Guangxi, China). **42-43**. *A. vietnamica* Miyake, 1996 (after Miyake 1996). **44-47**. *A. projecta* Lin, 2002 (from Hainan, China). **48-51**. *A. spilopteroides* Ohaus, 1914 (from Guangxi, China). **52-55**. *A. transversa* Lin, 1999 (from Yunnan, China).

30, **33**, **36**, **39**, **42**, **44**, **48** & **52**. Dorsal view. **31**, **34**, **37**, **40**, **45**, **49** & **53**. Ventral view. **32**, **35**, **38**, **41**, **47**, **51** & **55**. Lateral view from right. **43**, **46**, **50** & **54**. Lateral view from left.

Fig. **56**-**60**. Habitat of new species.

56. *A. yanxui* **sp**. **nov**. (Gulinjing, Maguan). **57**. *A. semiserrata* **sp**. **nov**. (Laiyanghe, Simao). **58**-**60**. *A. yemaoi* **sp**. **nov**. (Manwan, Yunxian).

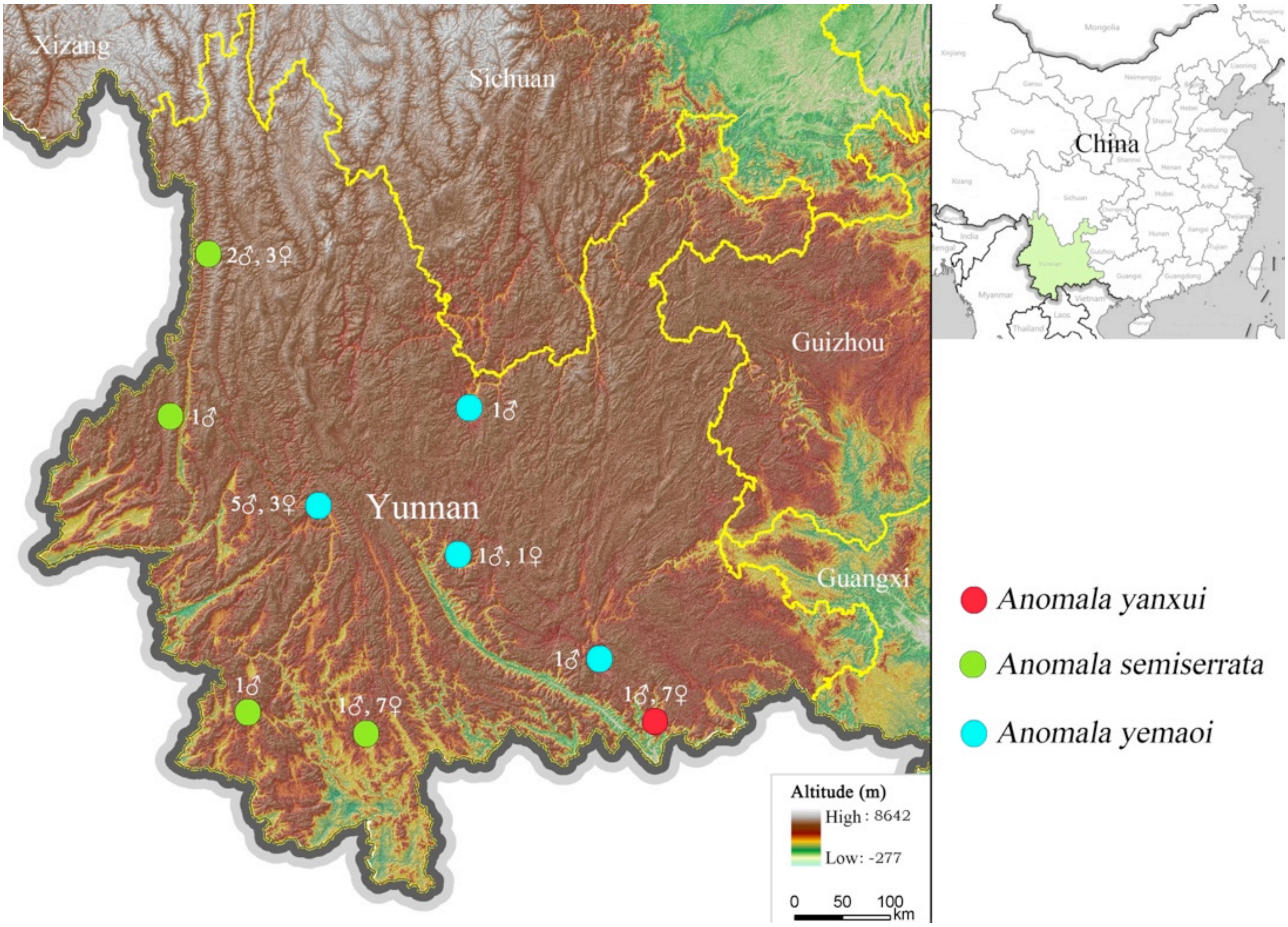

Fig. **61**. Distribution map of new species.

Résumé

Wang F.-L., 2022. – Trois nouvelles espèces du genre *Anomala* Samouelle du Yunnan, Chine (Coleoptera: Scarabaeidae, Rutelinae). *Faunitaxys*, 10(56): 1 – 9.

Trois nouvelles espèces du genre *Anomala* Samouelle, 1819 sont décrites du Yunnan, Chine: *Anomala semiserratus* **sp**. **nov**. de Baoshan, des régions de Fugong et de Lancan, et de Puer ; *Anomala yanxui* **sp**. **nov**. de la région de Maguan ; *Anomala yemaoi* **sp**. **nov**. de Mengzi, des régions de Xinping, de Yuanmou et de Yun.

Mots-clés. – Taxonomie, *Anomala*, illustration, genitalia, nouvelles espèces, Asie, Chine, Yunnan.

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Rizières en terrasse des Hani de Honghe dans le Yunnan, en Chine.

Crédits photos:

Fa-Lei Wang: Fig. 1-12, 15-55.
Carsten Zorn: Fig. 13 & 14.
Xu Yan: Fig. 56.
Hao Xu: Fig. 57.
Mao Ye: Fig. 58-60.

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